

REMARKS

Claims 16 and 20-27 are pending in this application. By this Amendment, claim 16 is amended. Support for the amendment to claim 16 is provided at least in the claims as originally filed. No new matter is added. Claims 17-19 and 29-31 are canceled without prejudice to, or disclaimer of, the subject matter recited in those claims. Reconsideration of the application in view of the above amendments and the following remarks is respectfully requested.

Entry of the amendments is proper under 37 CFR §1.116 because the amendments: (a) place the application in condition for allowance for the reasons discussed below; (b) do not raise any new issue requiring further search and/or consideration as the amendments are limited to amending independent claim 16 to include features of dependent claims 17 and 18, and canceling claims 16-19 and 29-31; and (c) place the application in better form for appeal, should an appeal be necessary. The amendments are necessary and were not earlier presented because they are made in response to arguments raised in the Final Rejection. Entry of the amendments is thus respectfully requested.

The Office Action rejects claims 16-27 and 29-31 under 35 U.S.C. §102(b) over WO 01/86035 A1 to Standley et al. (hereinafter "Standley") in view of U.S. Patent No. 6,593,211 B2 to Sato. The rejection is respectfully traversed.

Claim 16 recites, among other features, a method for producing a silicon epitaxial wafer comprising separating a silicon single crystal substrate from a susceptor during a hydrogen heat treatment step by allowing a lift pin which vertically moves the silicon single crystal substrate relatively to the susceptor to support the silicon single crystal substrate, and mounting the silicon single crystal substrate on the spot face of the susceptor during a vapor phase epitaxy step, wherein the hydrogen heat treatment step is performed at a temperature

lower than a vapor phase epitaxy temperature of the silicon epitaxial layer. Standley cannot reasonably be considered to teach, or to have suggested, this combination of features.

The method of producing a silicon epitaxial wafer recited in claim 16 is different from any method disclosed in Standley. Applicant's specification describes the advantages of the above-described features recited in claim 16, for example, in page 20, line - page 21, line 10; page 25, line 25 - page 26, line 6; page 28, lines 1-10; page 31, line 7 - page 32, line 5; page 48, lines 1-14. These advantages include, for example, preventing fine unevenness from occurring on the portions of a rear main surface of the silicon epitaxial wafer facing lift pin through-holes, and suppressing the haze level on the whole rear main surface of the silicon epitaxial wafer (see, e.g., page 48, lines 8-14), and suppressing the occurrence of crystal defects during a hydrogen heat treatment step, such as slip dislocation (see, e.g., page 31, lines 18-23).

In contrast to the method recited in claim 16, Standley, in Fig. 7 and page 33, line 22 - page 34, line 7, teaches a method of using lift pins 61-63 to support a wafer above a susceptor 60 throughout an entire epitaxial deposition process (see, e.g., Standley, page 33, lines 23-28). Standley provides further description of this method on page 35, lines 16-22, which states, "during the epitaxial growth step, gas inlet 35 introduces a silicon containing source gas which is flowed above the wafer substrate 4 to flush the back surface 5 of the silicon wafer substrate 4 and carry out-diffused dopant atoms away from the front surface 3." Standley, therefore, does not teach, nor would it have suggested, a method in which any silicon single crystal substrate separation occurs in the process. Standley, in contrast to Applicant's specification, fails to appreciate the desirability of a method having the features recited in claim 16 to, for example, produce a silicon epitaxial wafer that prevents fine unevenness from occurring on the portions of a rear main surface of the silicon epitaxial wafer facing lift pin through-holes, and produce a silicon epitaxial wafer in which the occurrence of crystal defects

during a hydrogen heat treatment step are suppressed. Because the silicon wafer is spaced from the susceptor by using lift pins during the epitaxial growth at high temperatures, in Standley, a slip occurs from the contacting position of the lift pins. Such is not the case with the method recited in the pending claims.

The April 3, 2007 Office Action asserts that pages 20 and 44 of Standley disclose the feature of a hydrogen heat treatment step performed at a temperature lower than a vapor phase epitaxy temperature of the silicon epitaxial layer step, as recited in claim 16. This cannot be accurate, on its face, at least for the reason that Office Action, as does the present Office Action, concedes that Standley fails to teach a hydrogen heat treatment step. Because it fails to teach or suggest a heat treatment step, Standley cannot logically disclose a temperature at which such a step is performed. Moreover, Standley necessarily also fails to appreciate the desirability, as described above, of performing a hydrogen heat treatment step performed at a temperature lower than a vapor phase epitaxy temperature of the silicon epitaxial layer step, as recited in claim 16.

For at least the foregoing reasons, Standley cannot reasonably be considered to teach, or to have suggested, the combination of all of the features positively recited in independent claims 16.

The Sato reference is not applied in a manner that would overcome the above-identified numerous shortfalls in the application of Standley to the subject matter of independent claim 16. Sato discloses a method of producing a semiconductor substrate. Sato, however, fails to teach, or to have suggested, a method for producing a silicon epitaxial wafer comprising the above-described features recited in claim 16. As such, the asserted combination of applied references cannot reasonably be considered to have suggested the combination of all of the features positively recited in independent claim 16. Further, claims 20-27 also would not have been suggested by the combination of Standley and Sato for at

least the respective dependence of these claims on an allowable base claim, as well as for the separately patentable subject matter that each of these claims recites.

Accordingly, reconsideration and withdrawal of the rejection of claims 16 and 20-27 under 35 U.S.C. §103(a) as being unpatentable over the combination of Standley and Sato, are respectfully requested.

In view of the foregoing, Applicants respectfully submit that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 16 and 20-27 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number set forth below.

Respectfully submitted,



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Attachment:

Petition for Extension of Time

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